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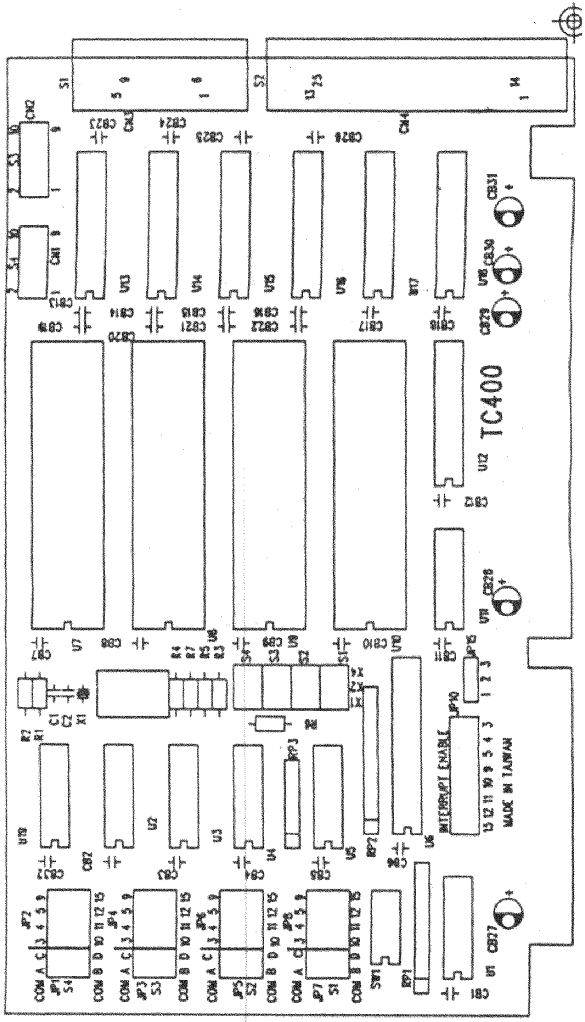
TC-400 User's Guide
Hi-Speed
Turbo 4COM I/O Adapter

* **Four High Performance RS-232 Serial Ports**
  - **Each with 16 bytes FIFO(16550), or 32 bytes FIFO(16650)**
* **Each port Independently configurable**
* **Support Standard & UNIX Mode Address-Ranges**
* **Individually Configurable Interrupts**
  - **IRQ3, 4, 5, 9, 10, 11, 12, 15**
* **Interrupt-Sharing**
  - **Allows all ports to utilize the same IRQ**
* **Support IRQ-Status Register**
  - **For UNIX compatibility and faster IRQ response**
* **Coexist with COM1 and COM2**
* **Fully DOS, WINDOWS, OS/2, UNIX Compatible**
* **Selectable Frequency for Operation Clock**



BOARD LAYOUT

TC-400 Turbo 4COM I/O Adapter
Interrupt Sharing
Selectable Frequency

INTRODUCTION:

The TC400 TURBO 4COM I/O adapter provides four high performance asynchronous serial RS-232 communication ports with flexibility in the selection of interrupt and port addressing.

The adapter can be configured to either standard-mode or UNIX-mode address for major operating systems such as: MS/DOS, MS/WINDOWS, IBM/OS2, UNIX, etc. All ports may be configured to the same interrupt (IRQ) for systems using software which is capable of interrupt sharing. It also provides on board interrupt status register for UNIX compatibility and faster IRQ response.

The TC400 TURBO 4COM I/O adapter supports three selectable frequency. It provides the choices of 1.8432MHz(X1), 3.6864MHz(X2), 7.3728MHz(X4) for operation clock to support 115.2K/230.4K with 16550 UART & 460K bps with 16650 UART respectively.

The following table show the Baud Rate Generator Programming table:

16*CLOCK DIVISOR "Decimal"	1.8432MHz Baud Rate	3.6864MHz Baud Rate	7.3728MHz Baud Rate
2304	50	100	200
1536	75	150	300
768	150	300	600
384	300	600	1200
192	600	1200	2400
96	1200	2400	4800
48	2400	4800	9600
24	4800	9600	19.2K
16	7200	14.4K	28.8K
12	9600	19.2K	38.4K
6	19.2K	38.4K	76.8K
3	38.4K	76.8K	153.6K
2	57.6K	115.2K	230.4K
1	115.2K	230.4K	460.8K

FEATURES:

* 16 bytes transmit FIFO and 16 bytes receive FIFO with error flags on four serial ports. The 16 bytes FIFO allows greater latency time in interrupt servicing when using in a multitasking environment.
* Four programmable serial input/output channels, software compatible with NS16C550A.
* Support MODEM control signals, (CTS*, RTS*, DSR*, DTR*, RI*, CD*).
* Individually configurable COMA to COMD on four serial ports:
  Standard mode-0 address at 3F8H(COM1), 2F8H(COM2), 3E8H(COM3), 2E8H(COM4).
  Standard mode-1 address at 2F8H(COM2), 3E8H(COM3), 2E8H(COM4), 2F0H(COM5).
  Standard mode-2 address at 3E8H(COM3), 2E8H(COM4), 2F0H(COM5), 3E0H(COM6).
  Standard mode-3 address at 2F0H(COM5), 3E0H(COM6), 2E0H(COM7), 260H(COM8).
  Standard mode-4 address at 3F8H(COM1), 2F8H(COM2), 3E8H(COM3), 2E0H(COM7).
  Standard mode-5 address at 2F8H(COM2), 3E8H(COM3), 2E0H(COM7), 2F0H(COM5).
  Standard mode-6 address at 3E8H(COM3), 2E0H(COM7), 2F0H(COM5), 3E0H(COM6).
  UNIX mode-0 address at 100H(COMA), 108H(COMB), 110H(COMC), 118H(COMD).
  UNIX mode-1 address at 180H(COMA), 188H(COMB), 190H(COMC), 198H(COMD).
  UNIX mode-2 address at 200H(COMA), 208H(COMB), 210H(COMC), 218H(COMD).
  UNIX mode-3 address at 280H(COMA), 288H(COMB), 290H(COMC), 298H(COMD).
  UNIX mode-4 address at 300H(COMA), 308H(COMB), 310H(COMC), 318H(COMD).
  UNIX mode-5 address at 380H(COMA), 388H(COMB), 390H(COMC), 398H(COMD).
  UNIX mode-6 address at 240H(COMA), 248H(COMB), 250H(COMC), 258H(COMD).
* Coexist with COM1 and COM2.
* Individually configurable interrupts (IRQ3, 4, 5, 9, 16 bit interrupts IRQ10, 11, 12, 15) for four serial ports.
* Support interrupt-Sharing: allows all ports to utilize the same IRQ.
* Support IRQ-status register for UNIX compatibility and faster IRQ response:
  UNIX mode-0 interrupt vector address at 140H.
  UNIX mode-1 interrupt vector address at 1C0H.
  UNIX mode-2 interrupt vector address at 240H.
  UNIX mode-3 interrupt vector address at 2C0H.
  UNIX mode-4 interrupt vector address at 340H.
  UNIX mode-5 interrupt vector address at 3C0H.
  UNIX mode-6 interrupt vector address at 2D0H.
* Selectable three frequency of 1.8432MHz(X1), 3.6864MHz(X2), 7.3728MHz(X4) for operation clock to support 115.2K/230.4K/460.8K bps respectively.
* DOS / Windows / WfW / NT / OS2 / UNIX compatbile.
* All functions can be disabled by jumpers.
* Host interface: IBM PC/AT or compatibles.
* Form factor: 175mm * 100mm.

CABLES:

* Third serial port DB-9 pin male type serial port plus fourth serial port DB-25 pin male type serial port.

CONFIGURATION:

MODE SELECT (SW1)

*

SW1-1	SW1-2	SW1-3	SW1-4	MODE	REMARK
on	on	on	on	STANDARD MODE 0	COM1 - COM4
off	on	on	on	STANDARD MODE 1	COM2 – COM5
on	off	on	on	STANDARD MODE 2	COM3 – COM6
off	off	on	on	STANDARD MODE 3	COM5 – COM8
on	on	off	on	STANDARD MODE 4	COM1, COM2, COM3, COM7
off	on	off	on	STANDARD MODE 5	COM2, COM3, COM7, COM5
on	off	off	on	STANDARD MODE 6	COM3, COM7, COM5, COM6
on	on	on	off	UNIX MODE 0	100H – 11FH
off	on	on	off	UNIX MODE 1	180H – 19FH
on	off	on	off	UNIX MODE 2	200H – 21FH
off	off	on	off	UNIX MODE 3	280H – 29FH
on	on	off	off	UNIX MODE 4	300H – 31FH
off	on	off	off	UNIX MODE 5	380H – 39FH
on	off	off	off	UNIX MODE 6	240H – 25FH

NOTE:

SW1-3 off : change COM4(2E8H-2EFH) to COM7(2E0H-2E7H) for S3 VGA card.

SW1-3 on : normal.

SW1-4 off : for UNIX MODE.

SW1-4 on : for STANDARD MODE (or DOS MODE).

INTERRUPT VECTOR ENABLE:

	SW1-5	INTERRUPT VECTOR
*	OFF	disable
	ON	enable

STANDARD MODE I/O ADDRESS

STANDARD MODE-0 ADDRESS

PORT ADDRESS	LOGICAL PORT	PHYSICAL PORT
3F8H-3FFH	COM 1	COMA
2F8H-2FFH	COM 2	COMB
3E8H-3EFH	COM 3	COMC
2E8H-2EFH	COM 4	COMD

STANDARD MODE-1 ADDRESS

PORT ADDRESS	LOGICAL PORT	PHYSICAL PORT
2F8H-2FFH	COM 2	COMA
3E8H-3EFH	COM 3	COMB
2E8H-2EFH	COM 4	COMC
2F0H-2F7H	COM 5	COMD

NOTE: Coexist with COM1 on board.

STANDARD MODE-2 ADDRESS

PORT ADDRESS	LOGICAL	PHYSICAL PORT
3E8H-3EFH	COM 3	COMA
2E8H-2EFH	COM 4	COMB
2F0H-2F7H	COM 5	COMC
3E0H-3E7H	COM 6	COMD

NOTE: Coexist with COM1 and COM2 on board.

STANDARD MODE-3 ADDRESS

PORT ADDRESS	LOGICAL PORT	PHYSICAL PORT
2F0H-2F7H	COM 5	COMA
3E0H-3E7H	COM 6	COMB
2E0H-2E7H	COM 7	COMC
260H-267H	COM 8	COMD

STANDARD MODE-4 ADDRESS

PORT ADDRESS	LOGICAL PORT	PHYSICAL PORT
3F8H-3FFH	COM 1	COMA
2F8H-2FFH	COM 2	COMB
3E8H-3EFH	COM 3	COMC
2E0H-2E7H	COM 7	COMD

STANDARD MODE-5 ADDRESS

PORT ADDRESS	LOGICAL PORT	PHYSICAL PORT
2F8H-2FFH	COM 2	COMA
3E8H-3EFH	COM 3	COMB
2E0H-2E7H	COM 7	COMC
2F0H-2F7H	COM 5	COMD

NOTE: Coexist with COM1 on board.

STANDARD MODE-6 ADDRESS

PORT ADDRESS	LOGICAL PORT	PHYSICAL PORT
3E8H-3EFH	COM 3	COMA
2E0H-2E7H	COM 7	COMB
2F0H-2F7H	COM 5	COMC
3E0H-3E7H	COM 6	COMD

NOTE: Coexist with COM1 and COM2 on board.

UNIX MODE I/O ADDRESS:

UNIX MODE-0 ADDRESS

PORT ADDRESS	PHYSICAL PORT
100H-107H	COMA
108H-10FH	COMB
110H-117H	COMC
118H-11FH	COMD
140H-147H	INTERRUPT VECTOR

UNIX MODE-1 ADDRESS

PORT ADDRESS	PHYSICAL PORT
180H-187H	COMA
188H-18FH	COMB
190H-197H	COMC
198H-19FH	COMD
1C0H-1C7H	INTERRUPT VECTOR

UNIX MODE-2 ADDRESS

PORT ADDRESS	PHYSICAL PORT
200H-207H	COMA
208H-20FH	COMB
210H-217H	COMC
218H-21FH	COMD
240H-247H	INTERRUPT VECTOR

UNIX MODE-3 ADDRESS

PORT ADDRESS	PHYSICAL PORT
280H-287H	COMA
288H-28FH	COMB
290H-297H	COMC
298H-29FH	COMD
2C0H-2C7H	INTERRUPT VECTOR

UNIX MODE-4 ADDRESS

PORT ADDRESS	PHYSICAL PORT
300H-307H	COMA
308H-30FH	COMB
310H-317H	COMC
318H-31FH	COMD
340H-347H	INTERRUPT VECTOR

UNIX MODE-5 ADDRESS

PORT ADDRESS	PHYSICAL PORT
380H-387H	COMA
388H-38FH	COMB
390H-397H	COMC
398H-39FH	COMD
3C0H-3C7H	INTERRUPT VECTOR

UNIX MODE-6 ADDRESS

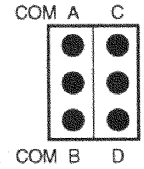
PORT ADDRESS	PHYSICAL PORT
240H-247H	COMA
248H-24FH	COMB
250H-257H	COMC
258H-25FH	COMD
2D0H-2D7H	INTERRUPT VECTOR

PORT ADDRESS JUMPER SETTING

There are four address jumper fields, one for each port. They form the left column of jumper fields labeled "S1"..."S4" on the left side of the board.

Each jumper field relates to one port. The address jumper settings are done alike for all ports.

Possible jumper setting for each port:



The TC400 TURBO 4COM I/O adapter will be delivered with the following I/O address configuration:

physical	logical
S1	COM1
S2	COM2
S3	COM3
S4	COM4

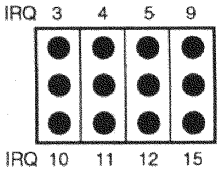
I/O PORT INTERRUPT

PORT INTERRUPT JUMPER SETTING

There are four interrupt jumper fields, one for each port. They form the left column of jumper fields labeled "S1"..."S4" on the right side of the board.

Each jumper field relates to one port. The interrupt jumper settings are done alike for all ports.

Possible jumper setting for each port:



INTERRUPT SETTING

INTERRUPT	NORMAL VALUE
IRQ3	COM2 and COM4
IRQ4	COM1 and COM3
IRQ5	free
IRQ9	free
IRQ10	free
IRQ11	free
IRQ12	free
IRQ15	free

The TC400 TURBO 4COM I/O adapter will be delivered with the following I/O address configuration:

physical	interrupt
S1	IRQ4 (shared)
S2	IRQ3 (shared)
S3	IRQ4 (shared)
S4	IRQ3 (shared)

INTERRUPT ENABLE (JP10):

All used interrupts for serial port must be enabled. This is done with the Interrupt Enable jumper field set to close.

The TC400 TURBO 4COM adapter will be delivered with the following interrupts enable configuration:

INTERRUPT SETTING

INTERRUPT	CONNECTED
IRQ3	yes
IRQ4	yes
IRQ5	no
IRQ9	no
IRQ10	no
IRQ11	no
IRQ12	no
IRQ15	no

SERIAL PORT OPERATION CLOCK SELECT:

(A) S1 Frequency select (JP14):

JP14	Frequency
close 1 (X1)	1.8432MHz
close 2 (X2)	3.6864MHz
close 3 (X4)	7.3728MHz

(B) S2 Frequency select (JP13):

JP13	Frequency
close 1 (X1)	1.8432MHz
close 2 (X2)	3.6864MHz
close 3 (X4)	7.3728MHz

(C) S3 Frequency select (JP12):

JP12	Frequency
close 1 (X1)	1.8432MHz
close 2 (X2)	3.6864MHz
close 3 (X4)	7.3728MHz

(D) S4 Frequency select (JP11):

JP11	Frequency
close 1 (X1)	1.8432MHz
close 2 (X2)	3.6864MHz
close 3 (X4)	7.3728MHz